are now being made. There is an ingenious combination of motor generators, which can be driven either mechanically or electrically. The switchboard and starting appliances for this combination of motor generators were designed and made in the institute.

A small workshop, with electrically driven tools, affords a good scope for the construction of original apparatus. Only typical instruments and standards have been purchased for the physical and electrical laboratories; the great bulk of the instruments and fittings have been both designed and made up in the polytechnic itself. Among the more recent pieces of original apparatus of home manufacture may be mentioned (1) a modified form of Michelson's interferometer, and another adaptation of the same for measuring to a millionth of an inch, and (2) an electro-magnetic speed indicator for use with dynamos and motors. Examples of original apparatus made at the South-Western Polytechnic have been exhibited at the Royal Society, the Royal Institution, and the Institution of Civil Engineers.

Good research work has been accomplished, including a series of tests on insulating materials, investigations on selenium cells, the effects of repeated heating and cooling on the magnetic properties of wrought iron, the relation between the thickness of metallic surfaces and the phase change of the reflected beam, tests with the Nernst lamp, and the negative resistance offered by certain metallic oxides. The results in the last piece of work have been published in the *Electrician*.

Other Points of Interest.

Several general considerations must be taken into account before the educational position of the South-Western Polytechnic can be rightly estimated. The recreative side of the polytechnic is not considered of prime importance, and the tendency seems to be to minimise its influence. In this respect it departs somewhat from the general type of polytechnic in the metropolis. There is also a laudable desire to initiate new departments as the need for them becomes evident, so that the institution may keep in touch with all the needs of the inhabitants in its neighbourhood. In this connection may be cited the work now being done on the women's side of the institute in the direction of offering ladies of the middle classes such instruction in domestic science as will make them independent of servants. Finally, it should be borne in mind that in more than one department the work being done is of quite as advanced a character as that in some university colleges.

A. T. Simmons.

PRIZE LIST OF THE PARIS ACADEMY OF SCIENCES.

AT the Annual Meeting of the Academy, held on December 18, M. von Tieghem gave his Presidential Address, and announced the prizes awarded for 1899. In his address, the President reviewed the scientific progress for the year, and then gave a short account of the life-work of the Members, Foreign Associates, and Correspondents who have died during the past year, MM. Naudin, Friedel, Frankland, Bunsen, Richards, Wiedemann, Marsh, Flower, and Riggenbach.

The prizes were awarded as follows: in Geometry—the Bordin Prize is not awarded, but M. Jules Drach receives an honourable mention, the Francœur Prize to M. Le Cordier, with an honourable mention to M. Le Roy, the Poncelet Prize to M. Cosserat, for the whole of his contributions to geometry and mechanics.

In Mechanics: the Extraordinary Prize of 6,000 francs to M. Bailles for his treatise on the Geometry of indicator diagrams, MM. Charbonnier and Galy-Aché, and Perrin, receiving supplementary prizes, the Montyon Prize to M. Partiot, the Plumey Prize to M. Bonjour for his inventions in connection with steam engines, and the Fourneyron Prize to M. A. Rateau for his theoretical and experimental researches on the theory of pumps.

In Astronomy: the Lalande Prize is awarded to Mr. W. R. Brooks for his important discoveries in connection with comets, and the Valz Prize to M. Nyrén, of Pulkova, for his work in sidereal astronomy.

In Physics: M. Blondlot receives the La Caze Prize for the whole of his researches in experimental physics.

In Statistics: the Montyon Prize is divided equally between the Office central des Œuvres de Bienfaisance, for the memoirs entitled "La France Charitable" and "Paris Charitable," and MM. Dumesnil and Mangenot, for a complete economic study of the trades, income, and mode of living of the inhabitants of Pointe d'Ivry.

In Chemistry: the Jecker Prize is given to M. Maurice Hanriot for the whole of his contributions to organic chemistry, the Wilde Prize to Dr. P. Zeeman for his important discoveries of the relations between the magnetic field and the nature and polarisation of light rays, and the La Caze Prize to M. Engel.

In Mineralogy and Geology: the Delesse Prize is awarded to M. Kilian for his studies in the French Alps, and the Fontanne Prize to M. Émile Haug for his palæontological studies.

In Botany: M. l'Abbé Hue receives the Desmazières Prize for his work on the anatomy and classification of the Lichens, M. Leuduger-Fortmorel an honorable mention for his memoir on the diatoms of the East Coast of Africa, MM. Jules Cardot and Hériband Joseph Montagne Prizes, the Thore Prize being divided between MM. Parmentier and Bouilhac.

In Anatomy and Zoology: the Grand Prize of the Physical Sciences is not awarded; the Bordin Prize is accorded to M. Viré for his memoir on the subterranean fauna of France, and the Savigny Prize to M. Guillaume Grandidier for his researches in Madagascar.

In Medicine and Surgery: Montyon Prizes are given to MM. Nocard and Leclainche for their book on microbial diseases, to Prof. Mayet for his "Treatise on Medical Diagnosis," and to M. A. B. Marfan for his work on the treatment and feeding of young infants. MM. Lejars, Fournier and Garnier receive mentions, and MM. Guillemonat and Labbé citations. The Barbier Prize is divided between MM. Houdas and Joanin, Lapicque, and Schlagdenhauffen. Since no work has been received meriting the Bréant Prize for cure or treatment of Asiatic cholera, the Commission has decided to divide the sum accumulated (6000 francs) between M. Vaillard, and MM. Cournont and Doyon for important work on the pathogeny and pathology of tetanus, MM. H. de Brun, Ch. Besnoit, and J. Guillé receiving mentions. The Godard Prize is awarded to M. Pasteau, the Serres Prize to M. Roule, with honourable mention to Prof. J. Beard, M. Maurice Caullery, and M. Félix Mesnil, the Chaussier Prize to M. Charrin, the Mège Prize to MM. Félix Terrier and Marcel Baudoin for their memoir on intestinal suture, the Baron Larrey Prize to MM. Arnaud and Lafeuille for their memoir on Tuberculosis in the Army, the Bellion Prize being divided between M. Cestan and MM. Crespin and Sergent.

In Physiology: the Montyon Prize for Experimental Physiology is given to Prof. Le Hello for his studies on the locomotion of the horse, M. Quinton receiving honourable mention, the La Caze Prize (Physiology) to Prof. Morat for his contributions to Experimental Physiology, and the Pourat Prize to MM. Weiss and Carvalho for their paper on the specific characters of muscular contraction in the animal series, the Philipeaux Prize not being awarded this year. In Physical Geography, M. Albert Vayssière receives the Gay Prize.

Of the General Prizes, the Arago Medal was awarded to Sir G. G. Stokes on the occasion of his jubilee at Cambridge. The Montyon Prize (unhealthy trades) is given to M. E. Collin for his memoir on the microscopy of foods of vegetable origin, M. P. Razous receiving a mention. M. Louis Ducos de Hauron is awarded the Trémont Prize for his invention of photography in colours by the method of superposed coloured images, M. Vaschy, the Gegner Prize, M. Moutard, the Petit D'Ormoy Prize (Mathematics), M. Alfred Giard, the Petit D'Ormoy Prize (Natural Sciences), M. Verbeck, the Tchihatchef Prize, M. Maurice Leblanc, the Gaston Planté Prize, M. René Metzner, the Cahours Prize, M. Lecaillon, the Saintour Prize, the Pasteur Institute, the Jean-Jacques Berger Prize, M. J. P. Siegler, the Prize founded by Mme. la Marquise De Laplace, the Prize founded by M. Félix Rivot being divided between MM. Siegler, Heurteau, Aron, and Becquerel.

RESULTS OF RECENT SOUNDINGS IN THE PACIFIC.[1]

CAPT. MOSER and I decided not to make any soundings nor do any deep-sea work until we had passed beyond the lines of soundings already run by the *Albatross* and *Thetis* between California and the Hawaiian Islands.

[1] Abridged from a letter received by the U.S. Fish Commission from Prof. Alexander Agassiz, and published n *Science* of December 8.

In latitude 31° 10′ N., and longitude 125° W., we made our first sounding in 1955 fathoms, about 320 miles from Point Conception, the nearest land. We occupied 26 stations until we reached the northern edge of the plateau from which rise the Marquesas Islands, having run from station No. 1, a distance of 3800 miles, in a straight line.

At station No. 2 the depth had increased to 2368 fathoms, the nearest land, Guadeloupe Island, being about 450 miles, and Point Conception nearly 500 miles distant. The depth gradually increased to 2628, 2740, 2810, 2881, 3003, and 3088 fathoms, the last in lat. 16° 38′ N., long. 130° 14′ W., the deepest sounding we obtained thus far in the unexplored part of the Pacific through which we are passing. From that point the depths varied from 2883 to 2690 and 2776, diminishing to 2583, and gradually passing to 2440, 2463, and 2475 fathoms, until off the Marquesas, in lat. 7° 58′ S., long. 139° 08′ W., the depth became 2287 fathoms. It then passed to 1929, 1802, and 1040 fathoms, in lat. 8° 41′ S., long. 139° 46′ W., Nukuhiva Island being about 30 miles distant. Between Nukuhiva and Houa-Houna (Ua-Huka) islands we obtained 830 fathoms, and 5 miles south of Nukuhiva 687 fathoms. When leaving Nukuhiva for the Paumotus we sounded in 1284 fathoms about 9 miles south of that island. These soundings seem to show that this part of the Marquesas rises from a plateau having a depth of 2000 fathoms, and about 50 miles in width, as at station No. 29 we obtained 1932 fathoms.

The deep basin developed by our soundings between lat. 24° 30′ N., and lat. 6° 25′ S., varying in depth from nearly 3100 fathoms to a little less than 2500 fathoms, is probably the western extension of a deep basin indicated by two soundings on the charts, to the eastward of our line, in longitudes 125° and 120° W., and latitudes 9° and 11° N., one of over 3100 fathoms, the other of more than 2550 fathoms, showing this part of the Pacific to be of considerable depth, and to form a uniformly deep basin of great extent, continuing westward probably, judging from the soundings, for a long distance.

I would propose, in accordance with the practice adopted for naming such well-defined basins of the ocean, that this large depression of the Central Pacific, extending for nearly 30° of latitude, be named Moser Basin.

The character of the bottom of this basin is most interesting. The haul of the trawl made at station No. 2, lat. 28° 23′ N., long. 126° 57′ W., brought up the bag full of red clay and manganese nodules with sharks' teeth and cetacean ear-bones; and at nearly all our stations we had indications of manganese nodules. At station No. 13, in 2690 fathoms, lat. 9° 57′ N., long. 137° 47′ W., we again obtained a fine trawl haul of manganese nodules and red clay; there must have been at least enough to fill a 40-gallon barrel.

The nodules of our first haul were either slabs from 6 to 18 inches in length and 4 to 6 inches in thickness, or small nodules ranging in size from that of a walnut to a lentil or less; while those brought up at station No. 13 consisted mainly of nodules looking like mammilated cannon balls varying from 4½ to 6 inches in diameter, the largest being 6½ inches. We again brought up manganese nodules at the Equator in about longitude 138° W., and subsequently—until within sight of Tahiti—we occasionally got manganese nodules.

As had been noticed by Sir John Murray in the *Challenger*, these manganese nodules occur in a part of the Pacific most distant from continental areas. Our experience has been similar to that of the *Challenger*, only I am inclined to think that these nodules range over a far greater area of the Central Pacific than had been supposed, and that this peculiar manganese-nodule bottom characterises a great portion of the deep parts of the Central Pacific where it cannot be affected by the deposit of globigerina, pteropods, or telluric ooze; in the region characterised also by red-clay deposits. For in the track of the great equatorial currents there occur deposits of globigerina ooze in over 2400 fathoms for a distance of over 300 miles in latitude.

Manganese nodules we found south of the Marquesas also, where in 2700 fathoms we obtained, perhaps, the finest specimens of red clay from any of our surroundings. As we approached close to the western Paumotus, and rose upon the plateau from which they rise, globigerina ooze passed gradually to pteropod ooze, then to fine and coarse coral sand. In the channel south of the Paumotus to Tahiti the coral sand passed to volcanic sand mixed with globigerinæ in the deepest parts of the line, and towards Tahiti passed to volcanic mud mixed with globigerinæ, next to fine volcanic sand, and finally, at the last sounding, off Point Venus, to coarse volcanic sand.

We made a few hauls of the trawl on our way, but owing to the great distance we had to steam between San Francisco and the Marquesas (3800 miles) we could not, of course, spend a great deal of time either in trawling or in making tows at intermediate depths. Still the hauls we made with the trawl were most interesting, and confirmed what other deep-sea expeditions have realised: that at great depths, at considerable distances from land and away from any great oceanic current, there is comparatively little animal life to be found. Where manganese nodules were found the hauls were specially poor, a few deep-sea holothurians and ophiurans, and some small actiniæ which had attached themselves to the nodules with a few other invertebrates, seemed to be all that lived at these great depths, 2500 to 2900 fathoms, far away—say from 700 to 1000 miles—from the nearest land.

The bottom temperatures of the deep (Moser) basin varied between 34·6° at 2628 and 2740 fathoms, to 35·2° at 2440 fathoms, and 35° at 2475 fathoms; about 120 miles from the Marquesas. At station No. 23, off the Marquesas, in 1802 fathoms, the temperature was 35·5°.

On our way to Tahiti from the Marquesas we stopped a few days to examine the westernmost atolls of the Paumotus.

It is premature from the examination of the western extremity of the Paumotus to base any general conclusions regarding the mode of formation of these atolls; certainly as far as I have gone there is absolutely nothing to show that the atolls of the Paumotus have not been formed in an area of elevation similar to that of Fiji. The evidence in Rairoa and in the atolls of the western Paumotus is very definite. Makatea is an elevated mass of coralliferous limestone similar in all respects to masses like Vatu Vara, Thithia, and others in Fiji. Like them Makatea is surrounded by a comparatively narrow shore platform cut out from the base of the limestone cliffs and on the seaward extension of which corals grow abundantly to depths of seven to eight fathoms, when they appear to become very much less numerous. So that it is not unnatural, as I am inclined to do, to look upon the area of the Paumotus as one of elevation, the raised and elevated land of which has been affected much in the same way by denudation and erosion as have the masses of elevated coralliferous limestone of Fiji. Only there seems to have been, from the evidence thus far presented, a far greater uniformity in the height of the elevation of the Paumotus. This would render the explanation I have given less evident had I not the experience of the Fiji group to guide me. I am informed that there are other islands and atolls in the Paumotu group, showing traces of this elevation, so that I am at any rate justified in denying that the Paumotus as such are situated in an area of subsidence and that subsidence has been the great factor, as is maintained by Darwin and Dana, in the formation of the characteristic atolls of the group.

It may be well to point out also that the Paumotus, like the Marquesas on one side and the Society Islands on the other, are situated upon a plateau similar to that upon which the last-mentioned groups are placed—this plateau having a depth of from 1200 to 1500 fathoms, and rising from the general oceanic basin which surrounds them, and which has a depth of from 2300 to 2500 fathoms. Furthermore, evidence of this elevation is found at the two extremities of the Paumotu plateau at Makatea, an elevated island consisting of tertiary coralliferous limestone, and at the Gambier Islands, which are volcanic islands of considerable height.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

DR. T. E. STANTON, of University College, Liverpool, has been appointed professor of engineering in University College, Bristol, in succession to Prof. Ryan.

DR. EDWARD TAYLOR JONES has been appointed professor of physics in the University College of North Wales, in succession to Prof. A. Gray, F.R.S. The Drapers' Company has made the College a grant of £200 a year for a period of three years towards the maintenance of the department of electrical engineering, pending the establishment of the department on a permanent footing.